WHAT IS CLAIMED IS:

1. A digital signal processing system comprising:

a delta-sigma modulator having an internal filter to integrate and decimate input data and further having a quantizer to provide feedback data to the combination decimation and integration filter.

2. The digital signal processing system of claim 1 wherein the delta-sigma modulator operates at a frequency of f_s, and the input data is sampled at a frequency equal to N times f_s.

3. The digital signal processing system of claim 2 wherein N equals 2.

4. The digital signal processing system of claim 1 further comprising:

an analog-to-digital converter to convert an analog signal into digital data and provide the digital data to the internal filter of the delta-sigma modulator, wherein the delta-sigma modulator has an operating frequency of N times f_s and the analog-to-digital converter operates at a frequency of 2 times N times f_s.

5. The digital signal processing system of claim 1 wherein the input data includes an audio signal.

6. The digital signal processing system of claim 1 wherein the internal filter comprises:

a first integration stage to integrate a sum of a first sample of input data, output data from the delay stage, and first negative feedback data from the quantizer, wherein the first sample of the input data to the first integration stage includes a pair of data samples respectively modified by a first gain and a second gain; and

a second integration stage to integrate the first sample of the input data, output data from the delay stage, and second negative feedback data from the quantizer, wherein the first sample of the input data to the second integration stage includes the pair of data samples respectively modified by a third gain and a fourth gain;

wherein the first and second gains are an independent linear combination with respect to the third and fourth gains.

7. A method of modulating input data comprises:

integrating and decimating the input data using an internal filter of a delta-sigma modulator to generate output data;

quantizing the output data using a quantizer of the delta-sigma modulator; and

providing feedback data from the quantizer to the internal filter of the delta-sigma modulator.

8. The method of claim 7 wherein the input data has a sampling frequency of f_s, the method further comprising:

integrating and decimating the input data at a frequency N times f_s, wherein N is greater than one.

9. The method of claim 7 further comprising:

converting the input data from an analog signal into a digital signal at a frequency of M times f_s immediately prior to integrating and decimating the input data at a frequency of N times f_s using the internal filter of the delta-sigma modulator.

10. The method of claim 9 wherein M divided by N equals 2.

11. A method of modulating input data sampled at M times a frequency f_s (Mf_s) using a delta-sigma modulator operating at frequency f_s, the method comprising:

receiving the input data sampled at frequency Mf_s;

converting the input data into data having a sampled frequency of f_s using an internal filter of the delta-sigma modulator operating at a frequency N times f_s to generate output data;

integrating the input data using the internal filter of the delta-sigma modulator;

quantizing the output data of the internal filter using a quantizer; and providing feedback to the internal filter from the quantizer.

12. The method of claim 11 wherein integrating the input data using the internal filter of the delta-sigma modulator comprises:

providing first and second data samples and first quantizer feedback data at the same time to a first integration stage, wherein the first and second data samples provided to the first integration stage are respectively modified by a first gain and a second gain;

providing the first and second data samples and second quantizer feedback at the same time to a second integration stage, wherein the second integration stage receives output data from the first integration stage and the first and second data samples provided to the second integration stage are respectively modified by a third gain and a forth gain;

wherein the first and second gains are an independent linear combination with respect to the third and fourth gains.

13. The method of claim 11 further comprising:

converting the input data from an analog signal into a digital signal at a frequency of M times f_s immediately prior to integrating and decimating the input data at a frequency of N times f_s using the internal filter of the delta-sigma modulator.

14. The method of claim 11 wherein M divided N is two.

15. The method of claim 11 wherein the input data includes an audio signal.

16. A recording media encoded with data based on the output data generated using the method of claim 11.

17. A method of using an internal filter of a delta-sigma modulator to decimate and integrate an input signal, the method comprising:

providing first and second data samples and first quantizer feedback data at the same time to a first integration stage, wherein the first and second data samples provided to the first integration stage are respectively modified by a first gain and a second gain;

providing the first and second data samples and second quantizer feedback at the same time to a second integration stage, wherein the second integration stage receives output data from the first integration stage and the first and second data samples provided to the second integration stage are respectively modified by a third gain and a forth gain;

integrating output data from the second integration stage using N-subsequent integration stages to generate quantizer input data, wherein N is any non-negative integer;

quantizing the quantizer input data; and

wherein the first and second gains are an independent linear combination with respect to the third and fourth gains.

18. The method of claim 17 further wherein providing the first and second data samples comprises providing the first and second data samples directly from an analog-to-digital converter.

19. The method of claim 17 further comprising:

using the quantized input data to encode an audio signal on a recording medium.

20. An apparatus for modulating input data sampled at N times a frequency f_s (Mf_s) using a delta-sigma modulator operating at frequency Nf_s, wherein M is greater than N, the apparatus comprising:

means for receiving the input data sampled at frequency Mf_s;

means for integrating and decimating the input data using an internal filter of the delta-sigma modulator operating at a frequency Nf_s to generate output data;

means for quantizing the output data of the internal filter using a quantizer; and

means for providing feedback to the internal filter from the quantizer.